

When compression forces act on container 100 in a direction generally parallel to central axis X—X, collapsible helical portion 82 can fold and/or deform to facilitate collapse of the container. With reference to FIG. 7, a collapsible container system is shown wherein compression forces are provided by helical cup threads 46 of cup 40 traveling along helical groove 80, in a manner similar to that described above. The collapsed portion 86 of container 100 is located below threads 46 and includes deformed collapsible helical portion 82' and deformed helical groove 80'. Cup 40 is shown with skirt 60 as depicted in FIG. 4. Suitable cup configurations include cups with internal helical threads of either constant or variable pitch. Collapse of at least a portion of the container's side wall results in a decrease of the internal volume of the container.

When collapsible container 100 is used to store and dispense consumer products, i.e., carbonated beverages or viscous substances such as pastes or condiments, the packager can provide a collapsible container system according to the present invention and fill the container with the substance. The consumer can then collapse the container in stages as the substance is used by turning cup portion 40 relative to container 100. Relative rotation of the cup and container causes the container to move from an extended position to a compressed position, thereby causing the distance between the top portion and the bottom portion of the container to decrease.

Although the illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention.

What is claimed is:

1. A longitudinally collapsible container comprising a top portion and a base portion joined by a generally cylindrical side wall structure, said generally cylindrical side wall structure having a longitudinal central axis and a collapsible helical portion, said collapsible helical portion having a collapsible surface of generally uniform radius extending generally parallel with respect to said central axis.

2. The collapsible container as in claim 1, wherein said generally cylindrical side wall structure is compressible from an extended position to a compressed position, wherein the distance between said top portion and said bottom portion is less in said compressed position than in said extended position.

3. The collapsible container as in claim 1, wherein compression forces acting in a direction generally parallel with said central axis cause said collapsible helical portion to deform, thereby causing the distance between said top portion and said bottom portion to decrease.

4. A collapsible container as in claim 1, wherein said generally cylindrical side wall structure further comprises at least one helical groove oriented towards said central axis.

5. A collapsible container as in claim [4] 1, wherein said collapsible helical portion is defined between adjacent revolutions of a helical groove.

6. A collapsible container as in claim 1, wherein said generally cylindrical side wall structure comprises a deformable material selected from the group consisting of metal foils, polymers, elastomers, and plastics.

7. A collapsible container as in claim 6, wherein said generally cylindrical side wall structure comprises polyethylene terephthalate.

8. A collapsible container as in claim 1, further comprising a viscous substance disposed therein.

9. A collapsible container as in claim 1, further comprising a carbonated beverage disposed therein.

10. A collapsible container as in claim 1, wherein the internal volume of said container is between about 0.3 liters and about 3 liters.

11. A collapsible container as in claim 1, further comprising compression means associated with at least a portion of said generally cylindrical side wall structure for compressing said collapsible helical portion.

12. A collapsible container as in claim 11, wherein said compression means comprises a cup section.

13. A collapsible container as in claim 11, wherein said generally cylindrical side wall structure further comprises at least one helical groove oriented towards said central axis and wherein said compression means is adapted to engage said helical groove.

14. A collapsible container as in claim 13, wherein said compression means comprises a cup section having an internal thread portion, said internal thread portion being configured and dimensioned to engage said helical groove.

15. A collapsible container as in claim 14, wherein when said cup section is rotated relative to said generally cylindrical side wall structure, at least a portion of said collapsible helical portion is caused to deform.

16. A longitudinally collapsible container system comprising in combination:

a collapsible container having a top portion and a base portion joined by a generally cylindrical side wall structure, said generally cylindrical side wall structure having a longitudinal central axis, a helical groove and a collapsible helical portion defined between adjacent revolutions of said helical groove, said collapsible helical portion having a surface being generally uniform in radius and extending generally parallel with respect to said longitudinal central axis; and

a cup section for engaging and retaining at least a portion of said generally cylindrical side wall structure within said cup section.

17. A collapsible container system as in claim 16, wherein rotation of said cup section relative to said collapsible container causes at least a portion of said collapsible helical portion to deform.

18. A collapsible container system as in claim 16, wherein said cup section has an internal helical thread adapted to engage said at least one helical groove.

19. A collapsible container as in claim 16, wherein said generally cylindrical side wall structure comprises a deformable material selected from the group consisting of metal foils, polymers, elastomers, and plastics.

20. A method of storing a carbonated beverage comprising:

providing a collapsible container having a top portion and a base portion joined by a generally cylindrical side wall structure, said generally cylindrical side wall structure having a central axis, a helical groove and a collapsible helical portion defined between adjacent revolutions of said helical groove, said collapsible helical portion having a surface being generally uniform in radius and extending generally parallel with respect to said central axis;

providing a cup section for engaging and retaining at least a portion of said generally cylindrical side wall structure within said cup section;

filling said collapsible container with a carbonated beverage;

dispensing a portion of said carbonated beverage; and

turning said cup portion relative to said collapsible container to decrease the distance between said top portion and said bottom portion of said container.

21. The collapsible container as in claim 1, wherein said collapsible helical portion travels at least 360° around the generally cylindrical side wall structure.

22. The collapsible container as in claim 1, wherein said collapsible helical portion is defined between first and second longitudinally spaced groove portions.

23. The collapsible container as in claim 22, wherein said first and second groove portions are portions of a helical groove that travels more than 360° around the generally cylindrical side wall structure.

24. The collapsible container as in claim 22, wherein said first and second longitudinally spaced groove portions travel around a portion of the generally cylindrical side wall structure at generally the same pitch.

25. The collapsible container as in claim 22, wherein said first and second groove portions travel upward in a counterclockwise direction as viewed from the top of the container.

26. The collapsible container as in claim 22, wherein said collapsible helical portion is disposed generally adjacent said bottom portion and at least third, fourth, fifth and sixth longitudinally spaced groove portions are disposed longitudinally above the collapsible helical portion.

27. A longitudinally collapsible container comprising a top portion and a base portion joined by a generally cylindrical side wall structure, said generally cylindrical side wall structure having a longitudinal central axis and a collapsible surface portion, said collapsible surface portion having a collapsible surface of generally uniform radius extending generally parallel with respect to said central axis and being disposed between first and second longitudinally spaced groove portions, wherein said first groove portion travels around a portion of the generally cylindrical side wall structure in an upward direction, away from the bottom portion and towards the top portion of the container.

28. The collapsible container as in claim 27, wherein said first groove portion is a portion of a helical groove.

29. The collapsible container as in claim 27, wherein at least a portion of said first groove portion is angled at a constant pitch.

30. The collapsible container as in claim 27, wherein said first groove portion travels at least 360° around the generally cylindrical side wall structure.

31. The collapsible container as in claim 27, wherein said first and second groove portions are portions of a helical groove that travels more than 360° around the generally cylindrical side wall structure and the collapsible surface is defined between the upper and lower longitudinally spaced portions of the helical groove.

32. The collapsible container as in claim 27, wherein at least portions of said first and second groove portions are angled at generally the same pitch and travel around a portion of said generally cylindrical side wall structure, thereby defining a collapsible helical portion therebetween.

33. The collapsible container as in claim 27, wherein said first groove portion travels upward in a counterclockwise direction as viewed from the top of the collapsible container.

34. The collapsible container as in claim 27, wherein said first and second groove portions travel upward in a counterclockwise direction as viewed from the top of the collapsible container, thereby defining a collapsible helical portion therebetween that also travels upward in a counterclockwise direction as viewed from the top of the collapsible container.

35. The collapsible container as in claim 34, wherein both said first and second groove portions are portions of a

helical groove that travels more than 360° around the generally cylindrical side wall structure.

36. The collapsible container as in claim 27, wherein compression forces acting in a direction generally parallel with said central axis cause said collapsible surface portion to deform, thereby causing the distance between said top portion and said bottom portion to decrease.

37. A collapsible container as in claim 27, wherein said generally cylindrical side wall structure comprises a deformable material selected from the group consisting of metal foils, polymers, elastomers, and plastics.

38. A collapsible container as in claim 37, wherein said generally cylindrical side wall structure comprises polyethylene terephthalate.

39. A collapsible container as in claim 27, further comprising compression means associated with at least a portion of said generally cylindrical side wall structure for compressing said collapsible surface portion.

40. A collapsible container as in claim 39, wherein said compression means comprises a cup section.

41. A longitudinally collapsible container comprising a top portion and a base portion joined by a generally cylindrical side wall structure, said generally cylindrical side wall structure having a longitudinal central axis and a plurality of longitudinally spaced collapsible surface portions disposed between the top and bottom portions, one or more said collapsible surface portions having a collapsible surface of generally uniform radius extending generally parallel with respect to said central axis and being defined between adjacent longitudinally spaced groove portions, wherein a first of said groove portions is generally disposed adjacent said top portion and a second of said groove portions is disposed longitudinally below said first groove portion, both said first and second groove portions traveling around a portion of the generally cylindrical side wall structure in an upward direction away from the bottom portion and towards the top portion of the container, thereby defining one said collapsible surface portions therebetween that also travels about a portion of the generally cylindrical wall structure in an upward direction.

42. The collapsible container as in claim 41, wherein the second groove portion is a portion of a groove that travels at least 360° around the generally cylindrical side wall structure.

43. The collapsible container as in claim 41, wherein the first and second longitudinally spaced groove portions are portions of the same helical groove that travels more than 360° around the generally cylindrical side wall structure.

44. The collapsible container as in claim 41, wherein portions of both said first and second groove portions travel in an upward, counterclockwise direction as viewed from the top of the collapsible container.

45. The collapsible container as in claim 41, wherein the collapsible surface portion defined between the first and second groove portions travels at least 360° around said generally cylindrical side wall structure.

46. The collapsible container as in claim 41, wherein a third groove portion is generally disposed adjacent said bottom portion, is longitudinally spaced from said first and second groove portions and travels around a portion of the generally cylindrical side wall structure in an upward direction away from the bottom portion towards the top portion of the container.

47. The collapsible container as in claim 46, wherein the first, second and third groove portions are portions of the same helical groove that travels more than two times around the generally cylindrical side wall structure.

48. The collapsible container as in claim 46, wherein at least six longitudinally spaced collapsible surface portions are disposed between the second and third groove portions.

49. The collapsible container as in claim 41, wherein compression forces acting in a direction generally parallel with said central axis cause one or more said collapsible surface portions to deform, thereby causing the distance between said top portion and said bottom portion to decrease.

50. A collapsible container as in claim 41, wherein said generally cylindrical side wall structure comprises a deformable material selected from the group consisting of metal foils, polymers, elastomers, and plastics.

51. A collapsible container as in claim 50, wherein said generally cylindrical side wall structure comprises polyethylene terephthalate.

52. A collapsible container as in claim 41, wherein the internal volume of said container is between about 0.3 liters and about 3 liters.

53. A collapsible container as in claim 41, further comprising compression means associated with at least a portion of said generally cylindrical side wall structure for compressing one or more said collapsible surface portions.

54. A collapsible container as in claim 53, wherein said compression means comprises a cup section.

55. A longitudinally collapsible container comprising a top portion and a base portion joined by a generally cylindrical side wall structure, said generally cylindrical side wall structure having a longitudinal central axis and a plurality of longitudinally spaced collapsible surface portions disposed between the top and bottom portions, at least one said collapsible surface portions having a collapsible surface of generally uniform radius extending generally parallel with respect to said central axis and being defined between first and second longitudinally spaced groove portions, said first groove portion being generally disposed adjacent the bottom portion and said second groove portion being disposed longitudinally above said first groove portion, both said first and second groove portions traveling about a portion of the generally cylindrical side wall structure in an upward direction away from the bottom portion and towards the top portion of the container, wherein the

second groove portion travels in an upward, counterclockwise direction as viewed from the top of the container.

56. The collapsible container as in claim 55, wherein the first groove portion also travels in an upward, counterclockwise direction as viewed from the top of the container, thereby defining a collapsible helical portion therebetween.

57. The collapsible container as in claim 56, wherein the first and second groove portions are portions of a helical groove that travels more than 360° around said generally cylindrical side wall structure.

58. The collapsible container as in claim 55, wherein the collapsible surface portion defined between the first and second groove portions travels at least 360° around said generally cylindrical side wall structure.

59. The collapsible container as in claim 55, wherein a third groove portion is disposed longitudinally above said first and second groove portions, the third groove portion traveling at least 360° around said generally cylindrical side wall structure.

60. The collapsible container as in claim 55, wherein compression forces acting in a direction generally parallel with said central axis cause one or more said collapsible surface portions to deform, thereby causing the distance between said top portion and said bottom portion to decrease.

61. A collapsible container as in claim 55, wherein said generally cylindrical side wall structure comprises a deformable material selected from the group consisting of metal foils, polymers, elastomers, and plastics.

62. A collapsible container as in claim 61, wherein said generally cylindrical side wall structure comprises polyethylene terephthalate.

63. A collapsible container as in claim 55, wherein the internal volume of said container is between about 0.3 liters and about 3 liters.

64. A collapsible container as in claim 55, further comprising compression means associated with at least a portion of said generally cylindrical side wall structure for compressing at least one said collapsible surface portions.

65. A collapsible container as in claim 64, wherein said compression means comprises a cup section.

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